

peripheral neuralgia was described as a stabbing, darting pain referred to the course of a nerve, shooting down the nerve like lightning, coming on suddenly, lasting but a moment, and repeated at intervals; the pain is so acute as to be unendurable if continuous. The part or limb affected with this form of neuralgia is colder, and the skin supplied by the neuralgic nerve is more or less numb, not tender to the touch, the patient liking to be rubbed, and frequently grasping the part with the hands and pressing it. If the neuralgia has lasted any time, there is more or less paralysis in the muscles supplied by the accompanying motor nerve. The author then gave, at some length, his views upon the generation and distribution of nerve-force from the capillary circulation, in order to make his description of the pathology of this form of neuralgia intelligible. He described a sentient nerve as a conductor to the brain of sensations taking place at the periphery; neuralgia is not, therefore, a hyperæsthesia of its healthy function. During health a nerve has no sensation proper in itself; and if it be struck, cut, or torn, the sensation is referred to the parts to which it is distributed; but in this form of neuralgia it is the nerve itself to which the pain is referred as darting up and down its course. A sentient nerve was likened to an iron conducting wire of a galvanic battery, which, if of a certain uniform diameter, conducts a given quantity of galvanism without being perceptibly affected by its passage; but if a portion of the wire be much finer than the rest, it becomes red-hot, being unable to conduct the whole of the galvanism, the remainder correlating into heat. So in a nerve. From mal-nutrition, it is unable to conduct normal sensations to the brain; the nerve-current, by affecting the polarity of the nerve itself, gives the idea of pain in that portion of the trunk of the nerve, its peripheric terminations at the same time being numbed. The author considered the indications for treatment, therefore, to be increased and healthy circulation, arterial and nervous. After enumerating the usual methods of treatment, he considered the only agent capable of carrying out these indications to be the continuous galvanic current; and he recommended, as the only apparatus that can be adapted to the surface of the body, and capable of generating a sustained current, the Pulvermacher chain—producing a continuous current of galvanic electricity in one uniform direction, mild, yet sufficiently energetic for medical purposes. Mr. Lobb then described the method of applying the chain, and exhibited some experiments with its aid—as the decomposition of water, contraction of muscles, &c. In the treatment of idiopathic peripheral neuralgia he looked upon the Pulvermacher chain as a specific. Immediately upon adapting the excited chain to the part, a genial glow is felt—not mere warmth, but a sense of vitality in the part; the patient is aware of a life-giving agent, and immediately says that he is relieved; the neuralgia disappears, and sensitiveness of the surface returns. The paper concluded with several interesting cases in which the continuous galvanic current afforded rapid and permanent relief.—*Lancet*, Dec. 10, 1859.

16. *On the Causes of the Independence of Bronchitis in relation to Pneumonia*.—M. ROBIN states (*Gaz. Méd.*, No. 2, 1859) that he has never seen the causes of the independence of bronchitis in relation to pneumonia stated by any author, and this, he believes, arises from the faulty notions which prevail as to the elementary structure of the organ of respiration. It is customary to represent the tissue of the lungs as a mere continuation or expansion of the bronchi, which is as incorrect as it would be to represent the uriniferous tubes of the kidney as a continuation of the urethra, bladder, and ureter. As long as he believed in this doctrine, M. Robin never could comprehend why bronchitis should not constantly be passing into pneumonia. Nothing, however, can be more distinct than the pathological anatomy and symptoms of the two affections, which may be sometimes observed co-existing, but never passing from the one into the other.

The differences between the two diseases, marked as they are, must remain incomprehensible to those who consider the entire tube as lined with an uninterrupted mucous membrane from the larynx to the extreme subdivisions into *cul-de-sacs*. The real state of things is, however, as follows: Having passed through a certain number of subdivisions, the bronchi, now no more than one

or two millimetres in diameter, lose their portions of the cartilaginous rings, and have no longer transverse muscular fibres, elastic longitudinal fibres, or a mucous membrane separable from the bronchial wall properly so called. They no longer possess a prismatic epithelium with vibratile cilia—losing, in fact, all the characters of bronchi. The pulmonary or respiratory canalicules, erroneously termed ultimate bronchial ramifications, continue to subdivide and terminate in rounded or ovoid *cul-de-sacs* (improperly called bronchial or pulmonary cells), which at the period of birth are from five to eight hundredths of a millimetre large, and in the adult attain the size of one or two tenths. These canals have not the structure of the bronchi, but are characteristic of the pulmonary parenchyma. They are surrounded by intimately interlaced bundles of elastic fibres, mingled with fibres of the laminated tissue, formed of fibro-plastic elements, and of vessels. These vessels form on the interior of the canalicules (which present slightly projecting folds), a network differing from that of the bronchi. This network consists of large capillaries, which nearly touch each other, so as to leave intervals smaller than the capillaries themselves. It is distributed on the very tissue of the walls of the pulmonary canalicules (there being no mucous membrane separable from elastic parenchyma), and is only separated from the cavity of these conduits by a layer of pavement epithelium with large nuclei, which commences where the cylindrical epithelium of the bronchi ceases. Thus the pulmonary canals, in which hæmatisation is accomplished, have a different structure to that of the bronchi which convey the air necessary for respiration. It is not possible to detach a mucous membrane distinct from the pulmonary parenchyma and the laminated tissue, in which, or on the surface of which, the capillary network is distributed, as is the case in the bronchi still provided with cartilages. In this way, we may explain the rapid absorption which takes place in the lung, as compared with the slower absorbing power of the organs provided with mucous membrane—as also the easier rupture of these capillaries, with discharge of blood, or of substances injected by the air-passages. There is, in fact, as great a difference in texture between the bronchi and the pulmonary parenchyma, as between that of the excretory duct of a gland, and of the gland itself.

It will, therefore, be seen that affections seated in two portions of the apparatus so different, may well present great distinctions in their course, etc. But a still more important cause also explains the rarity of the extension of inflammation from the bronchi to the pulmonary tissue. Thus, in the case of bronchitis, the portion of the capillary system which is the seat of inflammation belongs to the general capillary system properly so called, and receives its blood from the aortic or red-blood system; but in the case of pneumonia, the capillaries of the lesser circulation, deriving their supply from the black blood of the pulmonary artery, are in question. It is at the expense of this black blood that the morbid products of pneumonia are formed, as in hepatitis it is at the expense of the black blood of the vena porta that abscess of the liver is produced. We know, in fact, that although the pulmonary artery accompanies the bronchi throughout their entire extent, it gives no branch to them, nor to the interlobular partitions, and that it does not anastomose with the bronchial arteries. The latter entirely cease at the points where, or at a little beyond where, the small cartilaginous nuclei disappear from the bronchi, *i. e.* where the bronchial canalicules are only one millimetre, or a little more in diameter. This is the exact spot where the capillary distribution of the venous artery begins to take place between the contiguous walls of the pulmonary canalicules, forming on their sub-epithelial surface a network of quite a special type of mesh-work, which is also found in the lesser circulation of all classes of vertebrate animals, even to the branchial plates of fishes. Beyond the bronchi, the bronchial arteries only furnish *vasa vasorum*, and branches to the interlobular laminated tissue, which extend as far as the pleura.

These circumstances supply not only an answer to the question proposed in this article; but also explain some of the differences which distinguish the nature and progress of inflammation of the lungs from that of other parenchymatous organs. It explains also the differences of pneumonia, according to age, differences not exhibited so decidedly in the inflammations of any other organ, and which arise, not only because the parenchyma and the respiratory

canalicles undergo notable modifications, but also because modifications in its nature and course are produced upon the inflammation by the nature of the circulation. These are nowhere so decided as in the lesser circulation, which unites anatomically and physiologically the two sides of the heart, although its disturbances are often only caused indirectly, in consequence of lesions of the left side of the heart, instead of directly by changes on the right side.

Independently of the special type of distribution presented by the pulmonary capillaries, differing from that of the bronchial, their structure also differs in some points from that of the general capillaries. They are, in fact, amongst the largest of the body, and their parietes present smaller, more numerous, and more approximated nuclei than those of the other capillaries. It is, however, to be observed that the capillaries of the portal system in the liver present the same peculiarities of structure. These facts are not without their value, when we call to mind that inflammation is a disturbance of the capillary circulation.

17. *Pain as a Sign of Disease of the Stomach.*—Dr. HABERSHON read before the Medical Society of London (Nov. 14, 1859) a paper on this subject. He first noticed the general absence of pain in disease of the mucous membranes, except where the orifices of their canals were affected; and of the very frequent immunity from actual suffering in many morbid states of parenchymatous viscera. But in serous membranes an opposite condition was found to occur, almost any change, and especially those of a sudden or acute kind, being accompanied by severe and agonizing pain; and of such a character and severity as to demand perfect rest, this rest being a very essential element in the alleviation of the disease. In pericarditis, on the contrary, when occurring without pleurisy, pain was very frequently entirely absent, as for many years shown by Dr. Addison; and rest in this case would be impossible. The immediate object of the communication being the consideration of *pain* in connection with *disease of the stomach*, he proceeded to show its value as an indication, or non-indication, of disease of that organ, by several propositions:—

1. That acute so-called inflammation and disease of the stomach may be entirely free from pain, if the mucous membrane only be affected. Reference was made to the gastro-enteritis of children, and to the symptoms of irritant poisoning. Several instances were adduced, in one of which a large dose of oxalic acid was taken; and except pain in the mouth and throat, there was no suffering, but the patient completely recovered. In a second, a case of poisoning by sulphuric acid, the patient lived eleven days; but except that arising from the action of the acid on the mouth and throat, there was no evidence of suffering, or of pain, tenderness, &c., at the stomach. The whole of the mucous membrane was destroyed, but the deeper structures were uninjured. In a third case, one of poisoning by a solution of chloride of zinc—Burnett's disinfecting fluid—no pain whatever was suffered for three months; but eight days before death pain came on in the left side. Ulceration of the mucous membrane was found near both orifices; near the œsophagus was an opening into an abscess between the spleen and diaphragm; and near the pylorus extravasation was prevented by adherent omentum. It was believed by the author that this abscess had only dated from the commencement of the pain eight days before death, when probably the deeper structures had become involved.

2. That organic disease of the mucous membrane alone—as, for instance, cancer—may be comparatively free from pain. Reference was made to the detection of cancerous secondary tubercles without previous symptoms; and a specimen was shown of a large villous growth from the mucous membrane of the stomach, of which no idea had been entertained, the orifices being free, vomiting absent, and no pain being present for many weeks before death. The patient died from advanced cirrhosis, and at the commencement of her illness had complained of burning pain at the stomach.

3. That disease extending to the muscular or peritoneal coats, produces generally severe pain, as in ordinary ulceration or cancer. Two instances were given in which the intensity of the pain was the most prominent symptom, and in which, after death, the author had detected branches of the pneumogastric nerve involved in the dense fibrous edges of chronic ulcers.